CHP SUMMIT:

A NATIONAL DIALOGUE ON COMBINED HEAT AND POWER

Welcome and Opening Remarks

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U.S. Department of Energy

December 1, 1998

COMBINED HEAT AND POWER CHALLENGE

Summit Objectives & Desired Outcomes

- Spotlight the many advantages of CHP
- Highlight inter-relationships: policies, markets, technologies
- Discuss barriers and solutions
- Agree to next steps for a national strategy

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Summit Co-Chairs

- **Peter Carroll**

  Solar Turbines

- **Tom Casten**

  Trigen Energy

- **Paul Cicio**

  Dow Chemical

- **Carol Werner**

  Environmental and Energy Study Institute

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Key Drivers

- Economic Competitiveness
- Electricity Restructuring
- Environmental Quality
- Energy Security
- Climate Change

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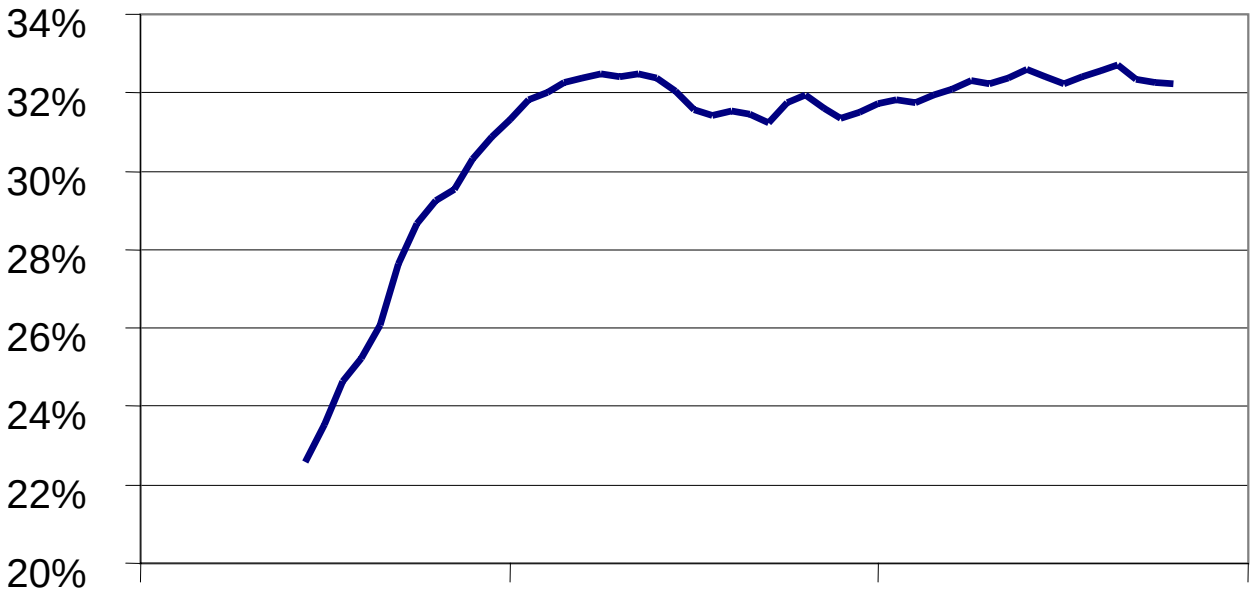
The Need For CHP

Stagnant Efficiency of U.S. Electric System



Source: EIA, Annual Energy Review 1996

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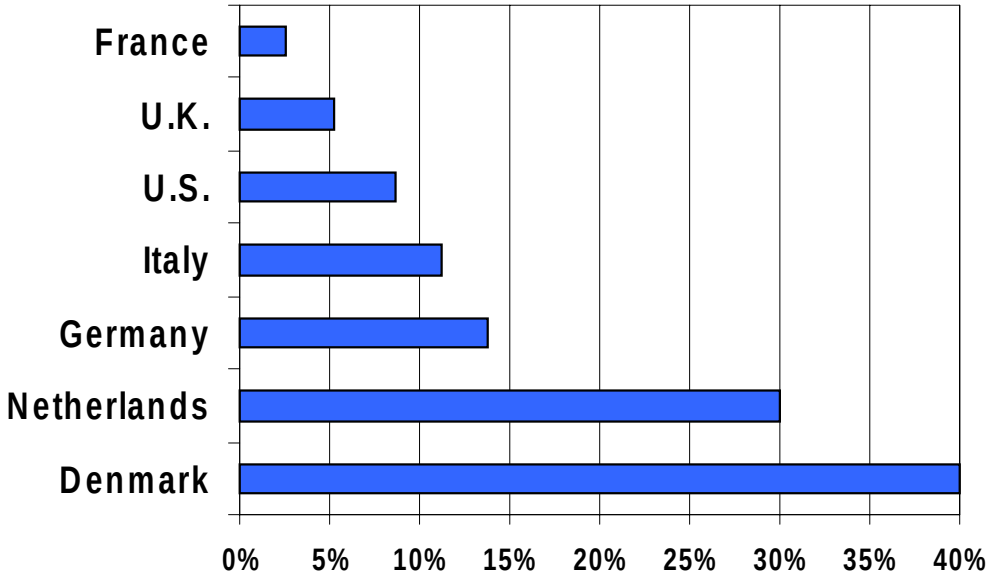
International Comparisons

CHP as a Share of National Power Production



- EU goal to double CHP share from 9% to 18% by 2010
- UK goal to increase CHP capacity by 35% by 2000

Sources: European Cogeneration Review, 1997; Cogen Europe, 1997; Annual Energy Outlook, 1997

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Case Study

MALDEN MILLS

Textile mill spent more than four years challenging state environmental regulations requiring the use of cost-prohibitive pollution control equipment

- **Two 4.3 MW combustion turbines installed late 1998**
- **Ceramic liners will reduce NO_x emissions to less than 15 ppm**
- **Expected system efficiency of 70%**
- **System will meet company's growing demand for reliable, economical steam and electricity service**

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Case Study

MIT

University overcame utility resistance to install on-site CHP system that will meet 94% of power, heating and cooling needs and will cut electric bills by $5.4 million a year

- **State restructuring legislation exempted MIT from local utility's $3,500 a day "customer transition charge"**
- **22 MW gas-fired combustion turbine is 18% more efficient than the technology it replaces**
- **System has reduced annual pollutant emissions by 45%**

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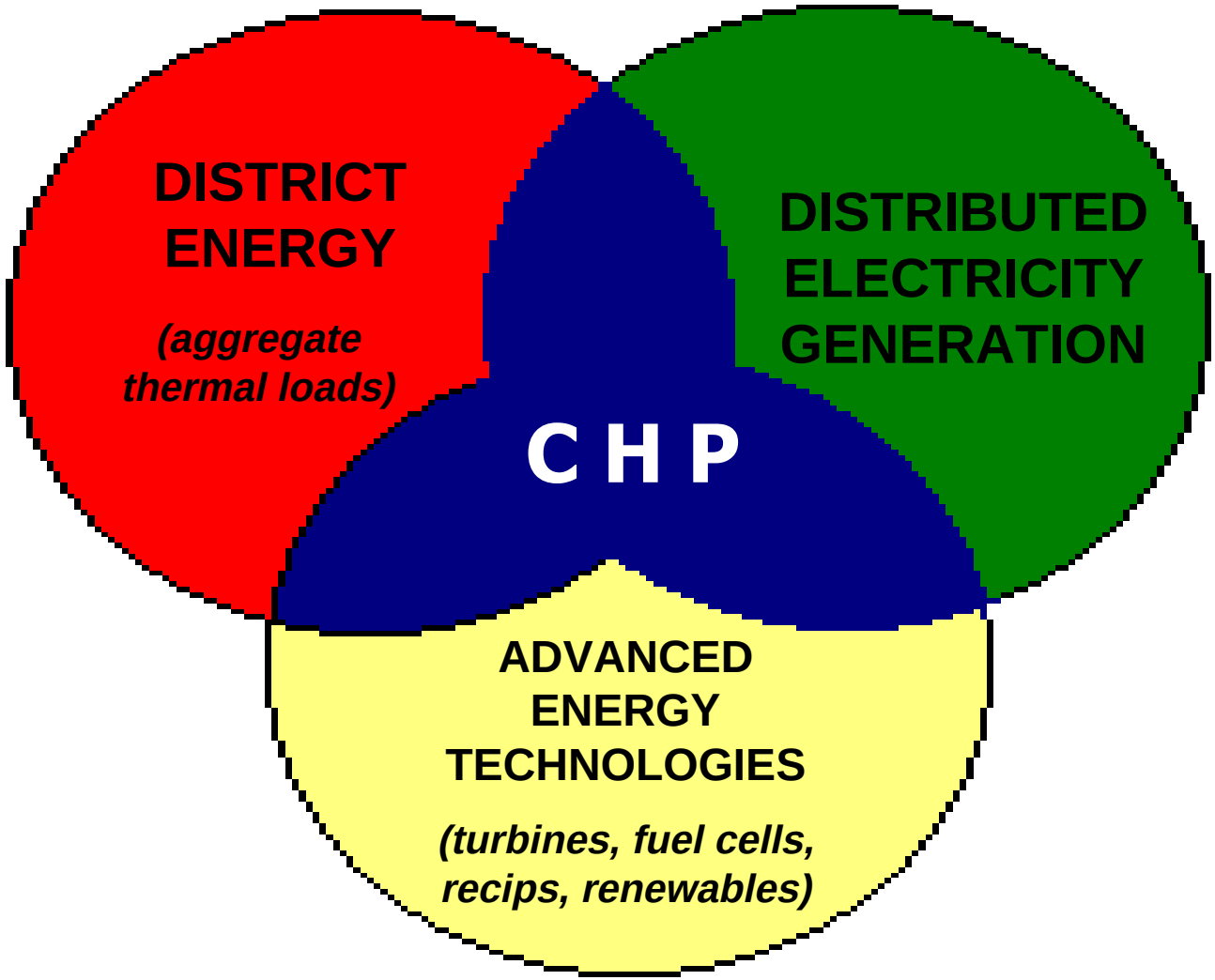
The Role of CHP



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What's in a Name?

- Cogeneration
- Total Energy Systems
- Integrated Energy Systems
- District Heating and Cooling
- Distributed Generation
- Combined Heat and Power

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U.S.CHPA

Founding Members:

ACE3

American Council for an Energy Efficient Economy

Solar Turbines
A Caterpillar Company

TRIGEN
TRIGEN ENERGY CORPORATION
The Thermal Sciences Company

NORTHEAST MIDWEST INSTITUTE

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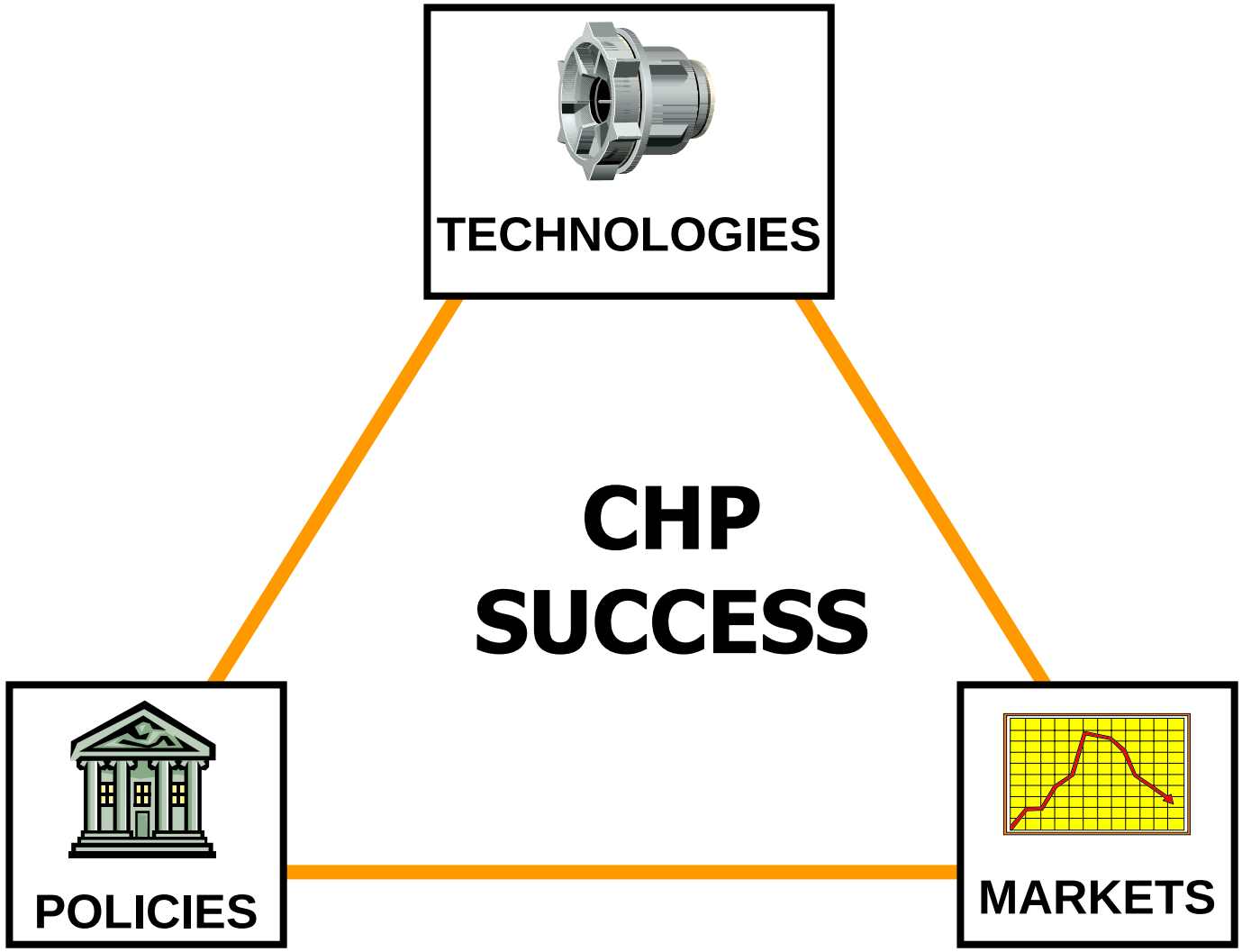
The Need for Coordinated Action



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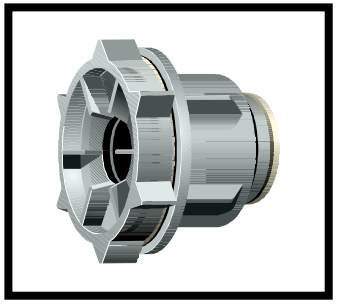
Technologies



- Improved Efficiency
- Improved Reliability
- Reduced Capital and O&M Costs
- Lower Emissions

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Policies

- Utility Restructuring
- Environmental Regulation
- Permitting and Siting
- Grid Interconnection

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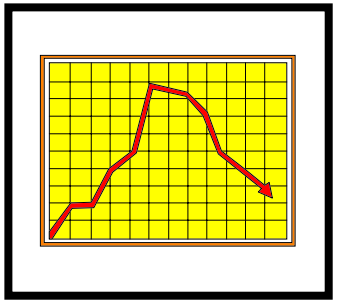
Markets



- Capital Costs and Investment Options
- Price, Quality, Availability of Power and Fuels
- Aggregation of Thermal Loads
- Aging Boiler Infrastructure
- Growing Electricity Demand

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The CHP Challenge

By 2010, double the amount of power generated with CHP

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Proposed Action Plan

- Develop supportive policy mechanisms
- Expand CHP opportunities in all markets
- Promote advanced technologies
- Strengthen government coordination
- Conduct outreach and education

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Next Steps

- Finalize Action Plan
- Develop Schedules and Milestones
- Measure Progress